

REMARKS

Claim 1 has been amended to incorporate therein the recitation of claim 2. Claim 2 has been canceled.

Review and reconsideration on the merits are requested.

The Examiner objected to the definition of the ethylenic polymer moiety M as defined in formula (3) of claim 1. Specifically, the Examiner questions whether formula (3) is for an ester or for a ketone.

In response, Formula (3) is described in more detail and by reference to the Examples at page 14 of the specification. M is properly defined in formula (3) of claim 1, and no amendment is needed.

Withdrawal of the rejection is respectfully requested.

Claims 1, 2 and 4-6 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 5,021,527 to Ohmori et al (or its equivalent EP 0 333 083 A2). The Examiner cited Ohmori et al disclosing a polymer meeting each of the terms of the rejected claims, including a polymer (Resin IAB) or polymer blend mixture (Resin IA and Resin IB) within the scope of claim 1. As to moiety A and moiety M, the Examiner cites the fluorine-containing polymer of formula (1) of Ohmori where R_f is a perfluoropolyether group and the repeating unit derived from the acrylate or methacrylate portion of the monomer meets M. As to the use of moiety B and moiety M, the Examiner cites polymers including repeating units derived from the monomers at col. 4 including self-crosslinkable functional groups. The Examiner further cites Ohmori at col. 6, lines 33-35 as disclosing that the subject polymers are soluble in general purpose solvents.

Applicants respectfully traverse. Ohmori et al does not meet each of the elements of claim 1. Therefore, Ohmori et al does not anticipate the claims, and the rejection under § 102(b) should be withdrawn. The reasons therefor are discussed in detail below.

Ohmori et al discloses a fluorine-containing water- and oil-repellent composition B comprising a copolymer of an acrylate monomer (3) having epoxy or carbon-carbon double bond (corresponding to the moiety B of the present invention) at its end (col. 4, lines 11-51) and a (meth)acrylate monomer (4) having a perfluoropolyether (PFPE) at its side chain (col. 4, line 52 to column 5, line 17). The moiety of main chain of the copolymer of Ohmori et al (corresponding to the ethylenic polymer moiety M of the present invention) is derived from formula (3) (col. 1, lines 55-66), and is within the scope of formula (3) of the present invention. Further, a fluorine content of the ethylenic polymer moiety is not more than 10 % by weight.

However, the (meth)acrylate monomer (4) having a PFPE at its side chain differs from present claim 1 with respect to the total number of PFPE recurring units.

Namely, examples of the perfluoropolyether (PFPE) (=R^f) of the (meth)acrylate monomer (4) of Ohmori et al are represented by the formula: $-(\text{CF}_2\text{CF}_2)_m(\text{O})_n\text{CF}(\text{R}^f)\text{CF}_3$

wherein m is an integer of from 0 to 5, n is an integer of from 1 to 5, n is 0 or 1, q is an integer of from 1 to 5, and R^f is a fluorine atom or trifluoromethyl,

or the formula:



wherein p is an integer of from 0 to 5, and R^f is defined above.

In the formula: $-(\text{CF}_2\text{CF}_2)_m(\text{O})_n\text{CF}(\text{R}^f)\text{CF}_3$, the total number of the PFPE units, i.e. $-\text{CF}_2\text{CF}_2\text{O}-$ units is at most 5 (q=5), and in the formula: $-\text{CF}(\text{CF}_3)\text{O}(\text{CF}_2\text{CF}(\text{CF}_3)\text{O})_p\text{CF}(\text{R}^f)\text{CF}_3$, the total number of the PFPE units, i.e., $-\text{CF}(\text{CF}_3)\text{O}-$ and $-(\text{CF}_2\text{CF}(\text{CF}_3)\text{O})-$ units, is at most 6

(p=5). Notably, the unit $-(CF_2CF(CF_3)O-$ is different from the polyfluoropolyether chains P represented by the formula (1) of the present invention. In addition, the PFPE used in the EXAMPLES of Ohmori et al, namely, $CH_2=CHCOOCH_2CF(CF_3)OCF_2CF(CF_3)OC_3F_7$, is outside the scope of formula (1) of present claim 1.

As explained above, the total number of perfluoroether units in Ohmori et al is at most 6, and does not satisfy the definition according to present claim 1, i.e., an integer of 7 to 40. Therefore the polymer of Ohmori et al has a structure that is different from that of the polymer (IAB) of present claim 1. In addition, Ohmori et al also does not disclose a mixture of the polymer (IA) and the polymer (IB).

Further, a characteristic feature of the present invention is that the curable fluorine-containing resin (1) is soluble in general purpose solvents, i.e., “organic solvents having no fluorine atom”. The language “insoluble in general purpose solvents” is defined at page 9, lines 19-22 of the specification as meaning a property of being soluble in at least one of organic solvents *having no fluorine atom*.

On the other hand, in Ohmori et al, the solvents for dissolving the polymer are “fluorine-containing solvents” (col. 6, lines 46-49).

To obtain solubility in a general purpose solvent (i.e., an organic solvent having no fluorine atom), it is important that (i) the curable fluorine-containing resin (I) has a fluorine content of not less than 0.1 % by weight and not more than 35 % by weight (page 41, lines 1-7 of the specification), and that (ii) the ethylenic polymer moiety M does not contain fluorine atom or contains fluorine atoms up to a fluorine content of not more than 10 % by weight (page 17, lines 5-12 of the specification).

According to the present invention, the total number of perfluoroether units is set larger to provide an excellent surface sliding property. Another problem addressed by the present invention is also that solubility in general purpose solvents (i.e., an organic solvent having no fluorine atom) is improved. In order to solve these problems, according to the present invention, a content (number) of perfluoroether units, a total fluorine content of the polymer and a fluorine content of the ethylenic polymer moiety M are properly regulated. These characteristic features of the invention are neither disclosed nor suggested by Ohmori et al.

In summary, the claimed curable surface modifier structurally differs from Ohmori et al with respect to the total number of PFPE recurring units. Namely, the total number of perfluoroether units in Ohmori et al is at most 6, and therefore does not satisfy claim 1 which requires from 7 to 40 such units (i.e., where $n_1+n_2+n_3+n_4$ is an integer of 7-40). Notwithstanding the foregoing, the exemplified PFPE units employed in the working examples of Ohmori et al are outside the scope of formula (1) of present claim 1; Ohmori et al does not disclose a mixture of a polymer (IA) and the polymer (IB); and in Ohmori et al the solvents for dissolving the polymer are fluorine-containing solvents whereas present claim 1 calls for solubility in general purpose solvents.

In view of the above-noted difference in structure relating to the number of PFPE recurring units, the present claims are not anticipated by Ohmori et al. Further, Applicants have also explained in detail why their invention is also unobvious over Ohmori et al.

Withdrawal of the foregoing rejection under 35 U.S.C. § 102(b) is respectfully requested.

Withdrawal of all rejections and allowance of claims 1 and 4-7 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

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Respectfully submitted,



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